The earliest known camera trapping in Australia: a record from Victoria

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Abstract
The use of automated cameras has become a favoured tool in fauna surveys because they are non-intrusive and a cheaper alternative to other trapping methods. But the use of camera traps is not new. This paper discusses some examples of the earliest use of camera trapping. (*The Victorian Naturalist* 132 (6) 2015, 171-176)

Keywords: cameras, fauna survey techniques

Introduction

Over recent years the use of automated cameras to detect wildlife has become an important tool for researchers in Australia and worldwide. The last 20 years, in particular, have seen a marked improvement in the reliability, portability and technological advancement of automated cameras. Indeed, the use of the 'camera trap' has grown exponentially amongst researchers in more recent times (Rowcliffe and Carbone 2008). They have now become a favoured tool for fauna surveys because they are mostly non-intrusive and a cheaper alternative to the many other techniques, such as trapping, hair snaring and interpreting scats and prints. As long as the practitioner is skilled, modern camera traps are relatively easy to use. However, this has not always been the case; one hundred years ago automated cameras were considerably more primitive and were usually hand built.

Pioneers of automated cameras

The historical use of automated cameras as a tool for the study of wildlife goes back some 125 years to the man considered the greatest pioneer of their use: an American, George Shiras III (Shiras 1906, 1913). Shiras used trip wires in order for his subjects to activate the camera. Today, most cameras use infrared detection technology in order to capture images. Shiras used complicated flash systems, external to the camera (Fig. 1), involving the use of magnesium to cause a bright flash, in order to illuminate his night shots (Fig. 2). Today, an array of infrared lights, within the camera, usually achieves illumination. As occurs today, however, Shiras used food lures to attract animals to the camera.

Another early pioneer of the technology, and perhaps the first to use cameras as a scientific tool, was Frank Chapman (Chapman 1927). He used Shiras's camera equipment to take photos of big cats in Panama, to see which species had left footprints that he could not identify. The camera technology was successful in achieving this, as he photographed Ocelots *Leopardus pardalis* and Cougars *Puma concolor* and was able to match their footprints.

Use of automated cameras in Australia

The historical use of camera traps in Australia is more recent than the images of Shiras and Chapman. They have been used, however, with varying levels of success, and across a wide spectrum of studies for fauna research in Australia since at least 1936.

Previously, it was thought that the earliest use of a camera trap in Australia (and indeed the southern hemisphere) was in Tasmania in January 1950 (Meek *et al.* 2015). An automated camera was used as a tool in the fruitless search for the Tasmanian Tiger *Thylacinus cynocephalus.* It was reported in the *Hobart Mercury* newspaper in February 1950 that:

> News of the extreme rarity of the Tasmanian "tiger" evidently did not impress at least one Victorian naturalist who arrived in Tasmania about a month ago equipped with camera and patent trip-lighting apparatus. Inspired by a large amount of optimism he set out to find and photograph one of the animals in its own environment.
>
> At least he had heard that it was not a common animal and therefore considered it should be photographed in the wild state before its extinction made such a thing impossible.

Fig 1. An early automated flash for a camera trap used by George Shiras (*National Geographic*, circa 1910).

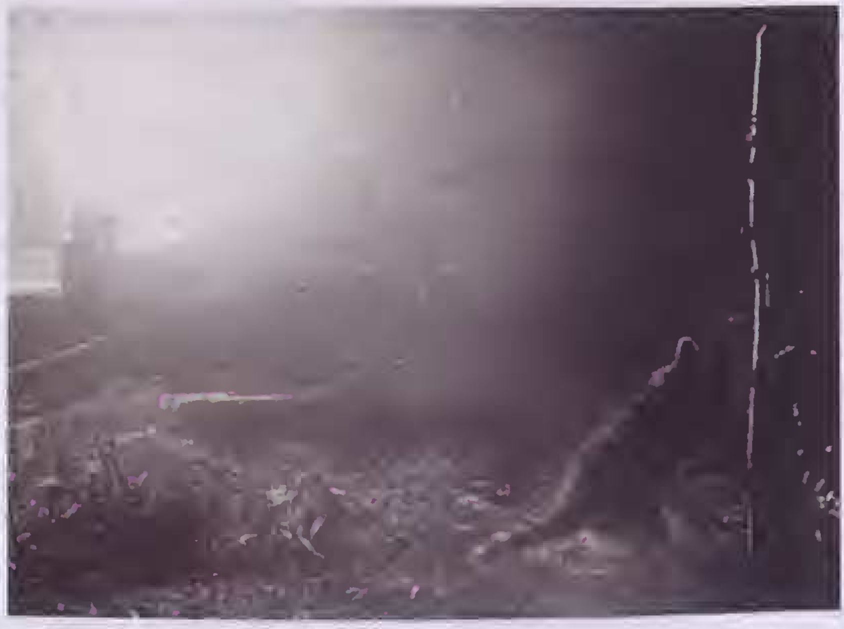

Fig 2. An early automated camera image from George Shiras circa 1910. The Racoon *Procyon lotor* in the image has triggered trip wires which activated the flash and the camera. The powerful magnesium flashlight can be clearly seen.

> He spent some time at Adams-field, and also at Cockle Creek, looking for game pads worn sufficiently to justify setting his camera and flash equipment in concealment beside the track, with a trip-string placed in such a fashion that if a "tiger," or any other animal, in fact, passed that way, it would take its own picture.
> The cause was worthy, but the result, of course, quite negative. No "tiger" showed itself; but he did see a good deal of the real Tasmanian bush and enjoyed the experience. And, while asking me not to divulge his name as "it might make him appear silly," he left last week with the resolve to return for another few weeks in the Autumn, to work either at Port Davey or the Arthur River, where he believed a "tiger" might be found.

It appears that no 'tiger' was found on subsequent trips either.

Another, not so anonymous, Victorian sought to photograph the local wildlife in Victoria in 1936, some 14 years prior to the Tasmanian trip (Littlejohns 1939). It was reported in *Wild Life* in 1939 that Ray T Littlejohns (famed for his work on the Superb Lyrebird *Menura novaehollandiae* and Mistletoebird *Dicaeum hirundinaceum*, and a president of the Royal Australasian Ornithologists Union) had been experimenting with the use of an automated camera with an 'open flash-lamp' in order to take pictures of the Yellow-rumped Thornbill *Acanthiza chrysorrhoa* in its nest. He hoped to determine why it:

> builds an open nest or sleep-out attached to the cosy closed-in room, which contains the eggs (Littlejohns 1939: 9).

He then went on to describe how the camera and flashlight apparatus would require much space with its 'masses of cords and springs, its levers and its clockwork power-plant' (Littlejohns 1939: 9). He did indeed produce three photographs of the thornbill's open top nest, which unfortunately proved to be empty in each image. Later studies demonstrated that it is, in fact, a dummy nest designed to fool predators, thereby always remaining empty (Galligan and Kleindorfer 2008).

This account appears to be the first documented evidence of a scientific study by means of a 'camera trap' in Australia. It occurred during or just prior to 1936. Though no specific date was given for the thornbill trial, it acted as a precursor for a study undertaken in November 1936, to find the elusive 'native cat' (or Quoll, *Dasyurus* spp.) which was otherwise 'almost extinct in most parts of Victoria' but 'fairly numerous in the stony country near Lake Corangmite' (Littlejohns 1939: 10). This early search for the Spot-tailed Quoll involved firstly laying out food in likely areas in order to get the animal 'accustomed to visiting the spot' that was chosen to place the camera (Littlejohns 1939: 10). This process of familiarising animals to trap sites is now known amongst trappers as 'free-feeding'. Littlejohns (1939: 10) then described how a 'small metal plate was fastened to the ground and served as a switch for each apparatus, and the cameras were focused on the switches before nightfall'. He used two cameras over several nights, one of which failed to operate because it was faulty. The remaining camera, after several misfires and events in which the bait (consisting of rabbits) was removed without the cameras being activated, took three shots. The photographs from that camera were developed in Melbourne the next day and apparently consisted of several blurred images of quolls and a good image of a local farm dog eating the bait!

Littlejohns also used his cameras and flashlights in attempts to get more 'glamorous' images of native animals undertaking their normal behaviour in the wild. This was in contrast to his previous efforts in using his cameras for more scientific studies. He visited a waterhole near Bendigo where he placed two cameras which were 'set carefully with switches connected to threads stretched at the water's edge' (Littlejohns 1939:16). The intended targets were wallabies drinking at the waterhole. After much experimentation with placing the camera at just the right location, he was rewarded with some images of the wallabies, one of which was published (Littlejohns 1939). He then described the night at the waterhole as 'one of the most attractive adventures in the experience of a flashlight hunter' (Littlejohns 1939: 16).

Littlejohns describes these early camera traps as 'animal self-portraiture' (1939: 10) (Fig. 3). In the early attempts, the switches operating the flash and the camera were placed on the ground, but they were triggered 'consistently' by small animals such as the 'Allied Rat' (or Bush Rat *Rattus fuscipes*). At a later stage, the switches were connected to a black thread stretched at 'such a height above the ground that the possums and the rats would pass beneath' (Littlejohns 1939: 10). However, he described how twigs dislodged by high winds frequently operated the switch. Littlejohns also describes how the 'Allied Rats' would be too fast once photographed and appeared as a 'blurred streak' on the negatives. He resorted to many 'ruses' and many 'gadgets' that were devised to overcome the problem of the 'momentary jump' of the subject, but the rat had beaten them all (1939: 10).

It was at this point that Littlejohns (1939) first used the term 'trap' when describing the trigger mechanisms connected to the flashlight, which in turn triggered the camera. This was not the first time that this term was used, however, as Frank Chapman used it in a feature article entitled 'Who Treads our Trails' in the September 1927 edition of *National Geographic* (Chapman 1927). 'Camera trapping' is the term that is now widely used amongst researchers today.

Littlejohns was not the only photographer experimenting with automated camera traps around this time. In January 1940, AF D'ombrain wrote an article in *Wild Life* (D'ombrain 1940) in which he discusses the technology of the time in more detail. The problems of moisture proofing, camouflage and power supplies were discussed, still relevant topics for researchers using camera traps today. One large difference, however, is that D'ombrain used a pair of 'powder charges' set up in just the right place to obviate shadows (Fig. 4). He described how the set-up of his devices required 'extreme care and thoroughness, all leads tested with an ammeter, shutter speed set, slide drawn and wires connected' (D'ombrain 1940: 15). It must have been a complex system, simply to take one photograph! Today, a camera trap can be set relatively quickly and multiple images can be taken over an extended period of time.

Into the Future

It may have been the Americans who pioneered the use of camera traps, and images they published in *National Geographic* in 1906 and 1913 are likely to have influenced other photographers such as Ray T Littlejohns, AF D'ombrain and the anonymous Victorian wildlife photographer. Modern camera traps have improved

Fig 3. An image circa 1936 showing a 'Silver-grey Possum' *Trichosurus vulpecula* caught on a camera trap by Ray T Littlejohns using honey as a lure. He included a clock in this image to record the time the photograph was taken. The image outside the white box was masked to provide the image only of the possum for publication.

markedly since the 1930s. Gone are the days of developing and building your own equipment. Modern units tend to be purpose built and available from retailers. They can operate in low light conditions, have electronic triggers rather than physical trip switches and they are, of course, digital. Many can also take video footage and even send images to modern handheld devices such as smartphones and tablets.

In Australia, modern camera traps have been used in recent years for a wide range of wildlife studies, including monitoring the cryptic and endangered Spot-tailed Quoll (Nelson *et al.* 2014), measuring scavenging activity on animal carcasses (Forsyth *et al.* 2014), assessing the impacts of control programs for pest animals (Gormley *et al.* 2011) and even monitoring wildlife responses to fire (Robley *et al.* 2013).

It will be interesting to see how camera trapping develops into the future, given the advances in the technology over the previous one hundred years. Perhaps in another hundred years we will have camera traps that recognise animal species, alert the researcher to the presence of endangered species, or even make estimates of abundance and other wildlife population parameters.

References

Chapman FM (1927) Who treads our trails. *National Geographic* **52**, 331–345.

D'ombrain, AF (1940) Bush folk take their own photographs. *Wild Life – Australian Nature Magazine*, January, 14–15.

Forsyth DM, Woodford L, Moloney PD, Hampton JO, Woolnough AP and Tucker M (2014) How does a carnivore guild utilise a substantial but unpredictable anthropogenic food source? Scavenging on hunter-shot ungulate carcasses by wild dogs/dingoes, Red Foxes and Feral Cats in south-eastern Australia revealed by camera traps. *PloS one*, **9**(6), e97937.

Galligan TH and Kleindorfer S (2008) Support for the nest mimicry hypothesis in Yellow-rumped Thornbills *Acanthiza chrysorrhoa*. *Ibis*, **150**, 550–557. doi: 10.1111/j.1474-919X.2008.00819.x

Gormley A, Albert R, Bowd M, Hatfield C, McDonald R, Thorp A, Scroggie M, Smith A and Warton F (2011) *Glenelg Ark 2005–2010: Evidence of Sustained Control of Foxes and Benefits for Native Mammals*. Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment.

Littlejohns RT (1939) Night life of the Bush. *Wild Life – Australian Nature Magazine*. **16**, 9–10.

Meek PD, Ballard G-A, Vernes K and Fleming PJS (2015) The history of wildlife camera trapping as a survey tool in Australia. *Australian Mammalogy*, Online early edition.

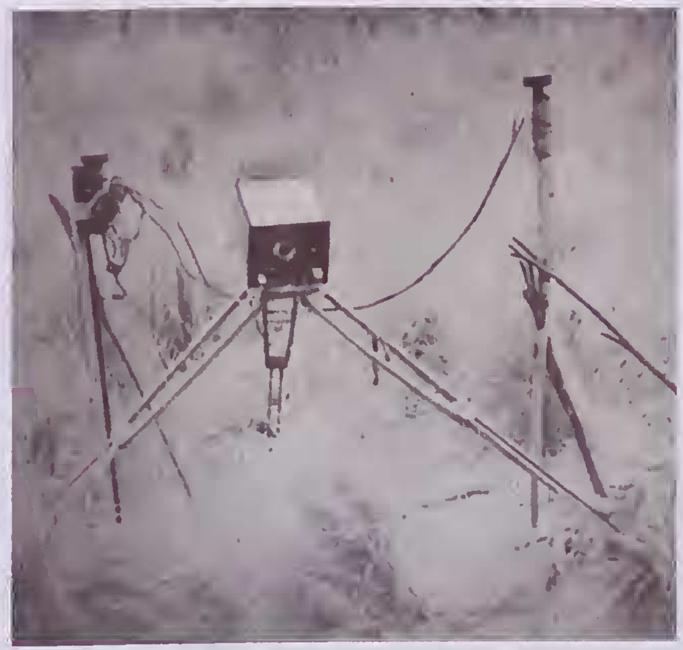

Fig 4. An image of AF D'ombrain's camera set up with one flashlight charge on each side of the camera in order to remove deep shadows. Taken from *Wild Life*, January 1940.

Nelson JL, Scroggie MP and Belcher CA (2014). Developing a camera trap survey protocol to detect a rare marsupial carnivore, the spotted-tailed quoll (*Dasyurus maculatus*). In *Camera Trapping: Wildlife Management and Research*, pp. 271–279. Eds P Meek and P Fleming (CSIRO: Collingwood, Victoria)

Robley A, Woodford L, Lindeman M and Sorre R (2013) The influence of fire, fox control and habitat structure on the presence of native mammals in East Gippsland. Arthur Rylah Institute for Environmental Research. Technical Report Series No. 249. Department of Environment and Primary Industries, Heidelberg, Victoria.

Rowcliffe JM and Carbone C (2008) Surveys using camera traps: are we looking to a brighter future? *Animal Conservation* **11**, 185–186.

Shiras G (1906) Photographing wild game with flash-light and camera. *National Geographic* **XVII**, 367–423.

Shiras G (1913) Wild animals that took their own pictures by day and night. *National Geographic* **XXIV**, 763–834.

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Ramaria abietina: A rare Coral Fungus

Introduction

It is quite common for rare or undescribed species of fungi to be found on forays or by searching. In this case, the discovery was unusual—an email with photograph was sent to Pat and Ed Grey via a friends group. The find was made by Marc Campobasso and, from Marc's photograph, the fungus was identified as the Green-staining Coral *Ramaria abietina* (Figs 1 and 2).

This species is apparently rarely found in Australia, although it is known from the northern hemisphere. The find aroused the interest of Dr Tom May, Dr Teresa Lebel (both from RBG Victorai) and Tony Young in Queensland. The Atlas of Living Australia (2015) shows only fourcollections – one from New South Wales (Bradley's Head, Sydney) and two from South Australia (from the same locality, Meningie near The Coorong) and one very recently uploaded, undated observation from Point Addis near Anglesea in Victoria. Young (2014) has an entry for the species in his online treatment of the Australian species of *Ramaria*, mentioning additional collections from Lane Cove, Sydney, and noting that there are few descriptive details available on Australian collections.

An arrangement was made with Marc Campobasso to meet at the site in order to make a collection from which a written description could be prepared, prior to lodging at the National Herbarium of Victoria. The site is close to the Merri Creek Bike Trail, Coburg (near Melbourne) in a revegetated area.

Description of fruit-body

Macroscopic features

Fruit-body: Small, height to 35 mm, width to 25 mm; coralloid, branched, branching three times; axils u-shaped; yellowish, staining green.
Branches: Upright, cylindrical, slender; yellowish becoming green with age or bruising.
Branch tips: Bluntly pointed; yellowish becoming dark green.
Stem: Short, length 10–15 mm, diameter 1–2 mm; white at base, greening towards first branching; usually buried below the surface of substrate and covered in downy white mycelium. At the stem base is a white mycelial mat with white rhizomorphs arising from the mat and extending into the substrate.
Spore print: Yellow.

Microscopic features

Spores: Pip-shaped to narrowly ellipsoidal; prominent, curved hilar appendage; finely roughened; 6.0–8.5 × 3.5–4.0(-5.0) µm (n=20), mean 7.04 × 3.93 µm, Q (length to width ratio)1.66–2.10.

Habit, substrate and habitat

Habit: Clustered groups, often in an arc around tree base.
Substrate: Ground amongst litter (mainly Lightwood *Acacia implexa* leaves at this site).
Habitat: In a revegetated metropolitan park with a coppice of Lightwoods, a solitary Swamp Gum *Eucalyptus ovata* and an understorey of Saltbush *Einadia trigonos* ssp. *trigonos*.